What is claimed is:

1. An apparatus for removal of process related materials from at least one substrate, said apparatus comprising:

a processing chamber arrangement defining a processing chamber;

means for exhausting gases from the processing chamber;

a structure in said processing chamber for supporting said substrate;

a source of reactive gas phase radicals that is located outside of said processing chamber;

means for conveying said reactive gas phase radicals from said source to said processing chamber for communication with said substrate therein; and

a source of ultraviolet radiation situated to illuminate at least one surface of said substrate to an ultraviolet radiation such that said ultraviolet radiation activates reactions between the gas phase radicals and the process related materials for use in removal of the process related materials.

2. The apparatus of Claim 1 configured for removing the process related materials as residues remaining on the substrate following at least partial removal of a photoresist layer from the substrate.

3. The apparatus of claim 1 wherein said source produces said ultraviolet radiation with a wavelength greater than approximately 250 nanometers.

4. The apparatus of claim 1 including an additional source of ultraviolet radiation outside of said processing chamber for producing an additional ultraviolet radiation which generates said reactive gas phase radicals by photodissociation without directly exposing the substrate to the additional ultraviolet radiation.

5. The apparatus of claim 4 wherein said additional source produces said additional ultraviolet radiation with an additional wavelength that is less than a wavelength of the ultraviolet radiation to which the substrate is directly exposed.

6. The apparatus of claim 5 wherein the additional wavelength is greater than or equal to approximately 172 nanometers.

7. The apparatus of claim 1 wherein said source of reactive gas phase radicals uses a plasma to generate the reactive gas phase radicals without exposing the substrate to the plasma.

8. An apparatus for removal of process related materials from at least one substrate, said apparatus comprising:

a processing chamber arrangement defining a processing chamber;

means for exhausting gases from the processing chamber;

a structure in said processing chamber for supporting said substrate;

a first source of at least a first species of reactive gas phase radicals, located outside of said processing chamber;

a second source, outside of said processing chamber, for providing at least one of a selected gas and a second species of reactive gas phase radicals; and

means for conveying said first species of reactive gas phase radicals from said first source and provided ones of the selected gas and the second species of reactive gas phase radicals from said second source to said processing chamber for reaction therein for use in removing said process related materials.

9. The apparatus of Claim 8 configured for removing the process related materials as residues remaining on the substrate following at least partial removal of a photoresist layer from the substrate.

10. The apparatus of claim 8 wherein said first source produces said first species of reactive gas phase radicals using photodissociation.

11. The apparatus of claim 8 wherein said first source produces said first species of reactive gas phase radicals using a plasma.

12. In an apparatus for removal of process related materials from at least one substrate, a method comprising:

defining a processing chamber;

providing means for exhausting gases from the processing chamber;

arranging a structure in said processing chamber for supporting said substrate;

locating a source of reactive gas phase radicals outside of said processing chamber;

conveying said reactive gas phase radicals from said source to said processing chamber for communication with said substrate therein; and

exposing at least one surface of said substrate to an ultraviolet radiation such that said ultraviolet radiation activates reactions between the gas phase radicals and the process related materials for use in removal of the process related materials.

13. The method of Claim 12 wherein the process related materials include residues remaining on the substrate following an at least partial removal of a photoresist layer from the substrate and exposing includes removing the residues.

14. The method of claim 12 including the step of producing said ultraviolet radiation with a wavelength greater than approximately 250 nanometers.

15. The method of claim 12 including using an additional source of ultraviolet radiation for producing an additional ultraviolet radiation which generates said reactive gas phase radicals by photodissociation without directly exposing the substrate to the additional ultraviolet radiation.

16. The method of claim 15 wherein said additional source produces said additional ultraviolet radiation with an additional wavelength that is less than a wavelength of the ultraviolet radiation to which the substrate is directly exposed.

17. The method of claim 16 wherein the additional wavelength is greater than or equal to approximately 172 nanometers.

18. The method of claim 12 including using, in said source of reactive gas phase radicals, a plasma to generate the reactive gas phase radicals without exposing the substrate to the plasma.

19. In an apparatus for removal of process related materials from at least one substrate, a method comprising:

defining a processing chamber;

providing means for exhausting gases from the processing chamber;

arranging a structure in said processing chamber for supporting said substrate;

locating a first source of at least a first species of reactive gas phase radicals outside of said processing chamber;

locating a second source, outside of said processing chamber, for providing at least one of a selected gas and a second species of reactive gas phase radicals; and

conveying said first species of reactive gas phase radicals from said first source and provided ones of the selected gas and the second species of reactive gas phase radicals from said second source to said processing chamber for reaction therein for use in removing said process related materials.

20. The method of Claim 19 including producing at least one of the first reactive species and the second reactive species using an ultraviolet radiation with a wavelength greater than or equal to approximately 172 nanometers.

21. An apparatus for removal of process related materials from a substrate, said apparatus comprising:

a processing chamber arrangement defining a processing chamber;

means for exhausting gases from the processing chamber;

a structure in said processing chamber for supporting said substrate;

a source of reactive gas phase radicals that is located outside of said processing chamber;

means for conveying said reactive gas phase radicals from said source to said processing chamber for communication with said substrate therein; and

a source of ultraviolet radiation situated to expose said reactive gas phase radicals to an ultraviolet radiation prior to reaching said substrate such that said ultraviolet radiation energizes the reactive gas phase radicals to thereafter activate reactions between the gas phase radicals and the process related materials for use in removal of the process related materials without directly exposing the substrate to the ultraviolet radiation.

22. The apparatus of Claim 21 configured for removing the process related materials as residues remaining on the substrate following at least partial removal of a photoresist layer.

23. The apparatus of claim 21 wherein said ultraviolet radiation includes a wavelength that is greater than or equal to approximately 172 nm.

24. In an apparatus for removal of process related materials from a substrate, a method comprising:

defining a processing chamber;

providing means for exhausting gases from the processing chamber;

arranging a structure in said processing chamber for supporting said substrate;

locating a source of reactive gas phase radicals outside of said processing chamber;

conveying said reactive gas phase radicals from said source to said processing chamber for communication with said substrate therein; and

exposing said reactive gas phase radicals to an ultraviolet radiation prior to reaching said substrate such that said ultraviolet radiation energizes the reactive gas phase radicals to thereafter activate reactions between the gas phase radicals and the process related materials for use in removal of the process related materials without directly exposing the substrate to the ultraviolet radiation.

25. The method of Claim 24 wherein the process related materials include residues remaining on the substrate following an at least partial removal of a photoresist layer from the substrate and exposing includes removing the residues.

26. The method of claim 25 wherein said ultraviolet radiation includes a wavelength of greater than or equal to approximately 172 nm.

27. An apparatus for removal of process related materials from at least one substrate, said apparatus comprising:

chamber means for defining a processing chamber;

first means for exhausting gases from the processing chamber;

second means for supporting said substrate in said processing chamber;

third means for producing reactive gas phase radicals, said third means located outside of said processing chamber;

fourth means for conveying said reactive gas phase radicals from said third means to said processing chamber for communication with said substrate therein; and

ultraviolet radiation producing means situated to illuminate at least one surface of said substrate to an ultraviolet radiation such that said ultraviolet radiation activates reactions between the gas phase radicals and the process related materials for use in removal of the process related materials.

28. An apparatus for removal of process related materials from at least one substrate, said apparatus comprising:

chamber defining means for defining a processing chamber;

first means for exhausting gases from the processing chamber;

second means for supporting said substrate in the processing chamber;

third means for producing at least a first species of reactive gas phase radicals, located outside of said processing chamber;

fourth means for producing, outside of said processing chamber, at least one of a selected gas and a second species of reactive gas phase radicals; and

fifth means for conveying said first species of reactive gas phase radicals from said first source and provided ones of the selected gas and the second species of reactive gas phase radicals from said third means and said fourth means to said processing chamber for reaction therein for use in removing said process related materials.

29. An apparatus for removal of process related materials from a substrate, said apparatus comprising:

chamber defining means for defining a processing chamber;

first means for exhausting gases from the processing chamber;

second means for supporting said substrate in said processing chamber;

third means for producing reactive gas phase radicals, said third means located outside of said processing chamber;

fourth means for conveying said reactive gas phase radicals from said third means to said processing chamber for communication with said substrate therein; and

fifth means for producing an ultraviolet radiation to expose said reactive gas phase radicals to the ultraviolet radiation prior to reaching said substrate such that said ultraviolet radiation energizes the reactive gas phase radicals to thereafter activate reactions between the gas phase radicals and the process related materials for use in removal of the process related materials from the substrate without directly exposing the substrate to the ultraviolet radiation.